

AGNATHES ET POISSONS. ANATOMIE, ETHOLOGIE, SYSTEMATIQUE. Par C. Arambourg et autres. Trois fascicules. (Traité de Zoologie. Anatomie, Systématique, Biologie. Publié sous la direction de M. Pierre-P. Grassé. Tome XIII) Masson et Cie Editeurs, Paris. 1958. 2758 pp, 6 color plates, 1889 figures. 39,000 francs.

Monumental in scope, this great work effectively crowns some two and a quarter centuries of growth in ichthyology since Peter Artedi (1705-1735). In 2758 pages and some 2000 illustrations (1889 numbered figures; many original) the authors have summarized much of the knowledge of paleontology, classification, anatomy, evolution, genetics, distribution, physiology, and ecology of the largest of the vertebrate groups. In the third volume of the Tome, there are included 63 pages of addenda that eliminate many of the criticisms that a reviewer might have made. These addenda largely make up for omissions and errors in the first two volumes; only a few pertain to the third. If one may presume that the first two volumes were more or less completed before the third, the additions serve well to update the bulk of the text. The index to all three volumes has approximately 10,000 entries and covers subject and systematic entities (but not authors of the literature so copiously cited).

The work was prepared under the direction of Pierre-P. Grassé. He was joined in principal authorship by more than 20 other scholars, including Arambourg, Bertin, Fontaine, and Stensiö, among others of outstanding prominence. The review of their effort by Gerd von Wahlert (Copeia, 1958, No. 4) points out a few of the relative weaknesses in treatment of ecology and behavior, especially in food habits and social biology.

The first volume (Premier Fascicule) deals in detail with: the biology of the living lampreys and hagfishes (Fontaine, et al.); the fossil cyclostomes (ostracodermis) (Stensiö); the gnathostomous fishes—skin and skeleton (Bertin), cranium (Devillers), myology (Danois), locomotion (Oehmichen), nervous system (Bertin; Grassé).

The second volume (Fascicule II) contains information on chemical and auditory senses, sound production, the digestive, respiratory, and circulatory systems, air bladder, sexuality and fertilization, and nesting (Grassé), lateral line system (Devillers), cutaneous sense organs of sharks and relatives (Budker), sight (Rochon-Duvigneaud), electric organs (Fessard), blood, plasma, and serum (Fontaine), endocrinology (Vivien), excretory and reproductive organs (Gérard), embryology (Pasteels), viviparity (Budker; Bertin).

Fascicule III contains sections on: larvae and metamorphosis (Bertin); growth, radiation, and migration (Fage; Fontaine); ecology (Bertin); poisonous fishes (Guibé); fish geography (Bertin, Arambourg). A major section treats with fish systematics.

Groups (and authors) are: acanthodians (Arambourg); placoderms (Arambourg); chondrichthyans (Arambourg and Bertin); actinopterygians (Arambourg, Bertin, and Lehman); brachiopterygians (Polypteridae) (Daget); lungfishes (Arambourg and Guibé); crossopterygians fossil (Arambourg), living (Millot and Anthony). The last of these accounts is singularly valuable since it contains the best, conveniently available, highly illustrated, original studies of the anatomy of the coelacanth, *Latimeria*, in some 40 pages. Although necessarily superficial in some of its parts, the living coelacanth chapter is strengthened by two handsome color plates and by numerous excellent half-tones. One of the color plates and many of the half-tones of *Latimeria* may be regarded as models of expository photography and serve far better than line drawings to show three-dimensional relationship in anatomy. Millot and Anthony have expanded their treatment of this living fossil in *Anatomie de Latimeria chalumnae* (Centre National de la Recherche Scientifique, Paris, 1958).

Obviously fishery students and research workers with reading competence in French will find in the present Tome a most convenient source of basic biological information on fishes. They will also find here a quick way into the literature, particularly to non-English European-language papers. In this sense the French work complements beautifully the 1957 two-volume *Physiology of Fishes* edited by M. E. Brown (Academic Press, New York). The bibliographic usefulness of such a work is attested by the growing spread of serial publications carrying information of value to ichthyologists and fishery scientists. Such publications numbered more than two thousand by mid-twentieth century as shown in a count of the journals, etc., listed in the working first draft of *A World Periodicals List for Fisheries Science* (Biology Branch, Fisheries Division, Food and Agriculture Organization, Rome, May 10, 1957).

Of the seventeen Tomes of the *Traité* as originally conceived, nine have now appeared. Of the six of these that concern the vertebrates, four have been published (XII, embryology, comparative anatomy, and biochemical characteristics; XIII, fish; XV, birds; XVII, systematics and ethology of mammals). Yet to arrive in print are: XIV, amphibians and reptiles; XVI, anatomy and reproduction of mammals. No research or teaching library concerned with fish should lack Tome XIII of the *Traité*.

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FISH AND SHIPS. By Ralph W. Andrews and A. E. Larsen. Superior Publishing Company, Seattle, Washington. 1959, 173 pp. 277 figs. \$10.00.

Dedicated "to an inveterate, incurable dreamer... an ingrained individualist in a regimented world—the fisherman", this volume provides an excellent historical account of commercial fishing in the North Pacific from the Columbia River to Bristol Bay. Well illustrated with photographs dated as early as 1867, the reader is carried back to the days before the "Iron Chink", when salmon cans were made by hand and dipped in lacquer to prevent rust.

Though not technical, the book is reviewed here because of its historic value and to call attention to the commercial fisherman as an individual, an often neglected fact. This book both documents the progress and development of the fisheries, and recalls the fisherman's struggle with his unique environment.

Emphasis is on the halibut and salmon fisheries but sections are included on the cod fishery, Pribilof sealing, and the whaling industry. The authors have managed an excellent portrayal of vessels and gear. Included are hooks, line, and floats used in the Indian halibut fishing; beach seining with horses on the Columbia River; fish wheels and traps; trolling gear, gill nets, otter trawls, and purse seines; and vessels from three-masted schooners to "smoke boats" to the modern diesel fleet.

Also documented are plant operations, descriptions of canning, fish curing, gear costs, and remuneration to the fishermen (5 cents for a 15-pound king salmon, 1½ cents per red salmon, ½ cent per pink salmon—1907 gill-netters' agreement). Descriptions of the early years of salmon canning include the first operation in California; handling methods when utilizing Chinese laborers; and the establishment of plants in Alaska.

The reviewers (formerly engaged in Alaska herring research) would have appreciated more detail on the herring industry and fishery, but are cognizant of the limitations necessarily placed on the coverage of the lesser fisheries in the area.

The text is divided into series of short articles, many written in the fisherman's jargon describe personal experiences which provide light, entertaining reading. The reproductions, many dating to the turn of the century, deserve special commendation. As evidenced by the variety of sources, the authors devoted considerable effort to securing photographs most representative of this era.

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A CENTURY OF BIOLOGICAL RESEARCH. By Harlow B. Mills and others. Illinois Natural History Survey Bulletin, Vol. 27, Art. 2, pp. 85-234, December 1958.

Among the biological research organizations of North America that have reached a respectable and respected age, the Illinois Biological Survey is both venerable and vigorous. This 155-page bulletin commemorates and chronicles a century of research

carried out by the Survey and its precursors—and looks ahead. The lead article by Harlow B. Mills, the present Chief of the Survey, is a fine bit of biological history. He and his co-workers present a panorama of Illinois biology and its practical problems, beginning with buffalo and passenger pigeons in Cook County and ending with sprayers putting the newest organic phosphorus insecticide on cabbages—DDT no longer gets the cabbage worms. Dr. Mills introduces the early naturalists and entomologists, many of whom were remarkably versatile persons and who accomplished much with little and despite many obstacles. The first two State Entomologists died with their boots on after a few years of one-sided struggle with the hordes of insects that afflicted pioneer Illinois farmers.

It was Stephen A. Forbes, however, who, after his appointment as State Entomologist in 1882, gave real impetus to the wider aspects of biological research. Although Dr. Forbes is best known for his classic, *The Fishes of Illinois*, which he wrote with R. E. Richardson and for that little gem of biological writing, *The Lake as a Microcosm*, he was also well informed and active in many other biological fields. He worked at top speed throughout his long life and, as Dr. Mills notes, was delighted when arrested far speeding on his eightieth birthday.

The contribution of George C. Decker is a fascinating account of past and present battles in the never-ending war with insects. It is interesting to note that biological control—putting a bunch of hungry young hogs in the orchard—was early used to eliminate fruit pests. Dr. Decker concludes that, despite the present effectiveness of organic insecticides, entomologists should again be investigating biological control methods. Herbert A. Ross gives the history of faunistic surveys in Illinois and development of the present extensive collections from the meager beginnings by a few enlightened amateurs a century ago. The many faunistic reports that have been published are listed. J. Cedric Carter does likewise for applied botany and plant pathology.

Dr. George W. Bennett's chapter on aquatic biology is of special interest to fishery workers. He points out that Dr. Forbes was a prime mover in much of the early work and much of it was done at the biological station at Havana on the Illinois River. Here Kofoid made his plankton studies and Richardson worked on bottom fauna. A few members of the Survey who have contributed to fishery knowledge in the more recent period are David H. Thompson, Samuel Eddy, William C. Starrett, Donald F. Hansen, and Dr. Bennett himself. Wildlife research is summarized by Thomas G. Scott, publications and public relations by James S. Ayers, and development of the technical library by Ruth R. Warlick. The format and printing are excellent and the writing uniformly good. The reviewer, as an editor of the *Transactions*, notes with envy that the Illinois Natural History Survey had three technical editors on its staff. The authors with the help of these editors have done a fine job.

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